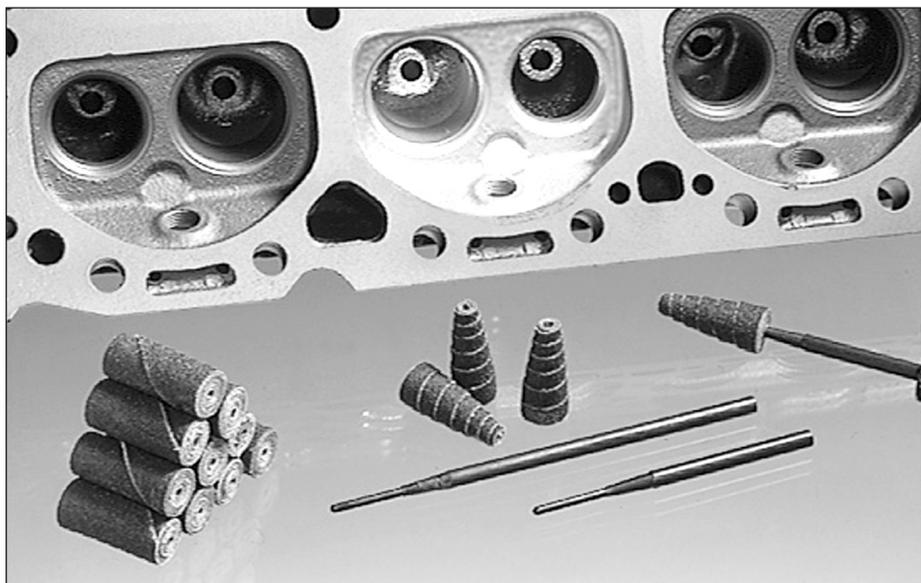


Eastwood

repair • restore • revive

Cylinder Head Porting Kit

Part #46056



Operating Instructions

Please read ALL instructions before use.

IMPORTANT SAFETY NOTICE

Safety Goggles and Dust Mask must be worn by anyone in the area where you are working. The porting process involves removing metal with a high-speed die-grinder. It is essential that you, and anyone else helping or watching, wear proper safety equipment to avoid injury from any metal particles.

Remove all jewelry. Rings, bracelets, watches, etc., should be removed to avoid the possibility of their getting caught on the cylinder head or wrapping around the mandrel on the grinder.

Avoid loose-fitting clothing. We also recommend wearing a long-sleeved shirt to protect your forearms from any flying particles.

Cylinder Head Porting Kit

The Eastwood Cylinder Head Porting Kit is designed to allow the home mechanic, using little more than a high-speed grinder, to clean, polish, and lightly modify the ports on cylinder heads. It is designed to help get the most out of an existing configuration, not for heavy modification or reshaping of combustion chambers and ports. NOTE: *For reshaping ports and valve guide bosses use the carbide burrs listed below.*

Your kit should contain the following items:

- 20 eighty-grit tapered abrasive rolls
- 20 eighty-grit cylinder abrasive rolls
- 2 four-inch mandrels
- 2 six-inch mandrels

What Other Supplies Will I Need?

You will also need cylinder head, intake/exhaust manifold, and carburetor baseplate gaskets. Buy a top-end rebuild kit or refer to a shop manual for your engine's gasket specifications.

Other Suggested Products:

- #46047 **Die Grinder** 22,000 rpm. Only 6" long. Uses 4 cfm @ 90 psi.
- #46028 **Carbide Cutting Burr** 1/4" diameter, 3" long.
Allows quick removal of more material from cast iron heads.
- #46029 **Aluminum Cutting Carbide Burr**, 1/4" dia., 3" long.
For quick removal of more material from aluminum heads.
- #13119 **Grinder's Grease**, 8 oz. tube. *Reduces loading and provides a smoother cut. A must when using abrasive rolls on aluminum.*

Internal combustion engines are sophisticated air pumps that pull in an air/fuel mixture, compress it, ignite it, react to the ignition and expel the exhaust fumes. The better an engine pumps air, the more efficiently it will operate. This is one reason why we've seen a turn to multi-valve engines in recent years. More valves means more air moving through the engine. More air means greater engine efficiency – both more power and better fuel economy.

When you "port" an engine, you remove imperfections and restrictions between the combustion chamber and intake manifold and, therefore, increase air flow. This is done by **1)** "smoothing" (or, grinding) the passages in the intake manifold so that they are the same size as the gasket and cylinder head, and **2)** removing "rough cast" or "flash" imperfections in the cylinder heads and exhaust manifolds.

Getting Started

Before porting your cylinder heads and manifolds, remove from the engine and disassemble. Be certain that they are not cracked or warped. Cracks can be located with the MagnaFlux Crack Detector. If you have any doubts about their condition, have them checked at a reputable machine shop in your area. Do not attempt to grind-out cracks in the castings. Warped cylinder heads and manifolds should never be re-installed.

These parts should also be very clean. Remove all carbon from combustion chamber and exhaust ports. "Hot Tanking" is recommended for thorough cleaning. Otherwise, you will not be able to tell if the parts are suitable for porting. Also, the life of abrasive materials will be greatly reduced. Pay particular attention to the exhaust cross-over, which is usually clogged with carbon and will affect engine performance if not cleaned out.

Gasket Matching the Cylinder Head Intake Ports to the Intake Manifold

This method assures that the cylinder head intake ports match perfectly to the intake manifold port openings. Following your vehicle shop manuals, remove the intake and exhaust valves. Use a spring compressor to avoid damaging the valves during removal.

- 1) Thoroughly clean the cylinder head gasket-mating surface and intake manifold gasket-mating surface using PRE (#10041Z), acetone or lacquer thinner.
- 2) Coat the manifold gasket area with Blue Layout fluid or a light coating of dark colored spray paint and allow to dry. This will make it very easy to see the scribe lines you will make later.
- 3) Place a new intake manifold gasket (the same you will be using for assembly) in position.
- 4) Secure the gasket with washers under the bolt heads to hold the gasket in place.
- 5) Using a scribe, with the gasket as the template, trace the outline of the intake port holes of the gasket onto the cylinder head and then onto the intake manifold.
- 6) Remove the gasket and repeat for the outer side, if applicable.

NOTE: *It is very important that the intake manifold gasket be placed in the EXACT position of its permanent installation. Otherwise the intake ports will be ground incorrectly and the cylinder head or intake manifold ruined. Mark the gaskets as to left and right, so they are installed on the correct side.*

- 7) Attach an abrasive roll to a mandrel. Push it onto the mandrel and turn it down onto the screw threads. Use the shorter mandrels wherever possible, saving the longer ones for the deeper port areas.
- 8) Attach the mandrel to a high-speed die-grinder (22,000 rpm-max.) grind material from the cylinder head and intake manifold port openings back to the scribe lines.

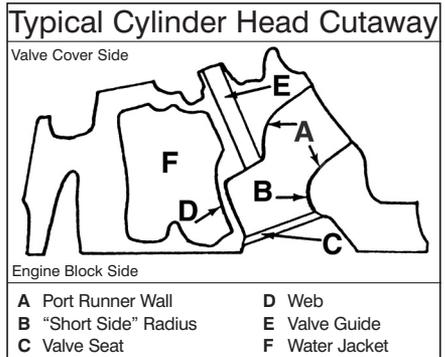
Gasket Matching the Cylinder Head Exhaust Ports to the Exhaust Manifolds or Headers

On the exhaust port side of the cylinder head, follow steps 1-8 as above. Remember to clean the surface thoroughly. Apply Blue Layout fluid or a light coating of dark colored spray paint. Securely and accurately attach the exhaust gasket and with a scribe trace the outline of the gasket port openings onto the cylinder head. Grind off material back to the scribe lines.

Porting Cylinder Heads

After “gasket matching” the cylinder head(s), remove any roughcast or “flash” in the intake and exhaust ports. Do not strive for a “mirror finish”, as an 80-grit finish is ideal for the intake ports. Otherwise you may disturb the “turbulence” necessary for proper fuel atomization.

Refer to the diagram for porting steps. **1)** Using the abrasive rolls smooth the rough casting of the port runners (A). **2)** Carefully smooth any casting flash, without removing much metal, on the “short side radius” (B) being careful not to hit the valve seat (C). Also be careful not to remove too much material from the cylinder web wall (D), simply remove the roughcast or flash from this area, as the web may be damaged. A damaged web wall will allow water from the water jacket (F) into the cylinder. If this occurs the head will need to be replaced. Do not touch the valve guides (E), or seats (C), with the spinning abrasive rolls. Continue to work both the intake and exhaust ports until the castings have been smoothed. If there is a lot of material to be removed in any of the steps, use a carbide burr for the first rough cuts. **3)** Thoroughly clean cylinder heads and intake manifolds before assembly to remove all traces of metal. **4)** Carefully smooth the combustion chamber by smoothing the rough casting **only!** Again, do not allow the spinning rolls to contact the valve seats.



NOTE: *You can use old valves to protect the seats during this step.*

If you have any questions about the use of this product, please contact
The Eastwood Technical Assistance Service Department:
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